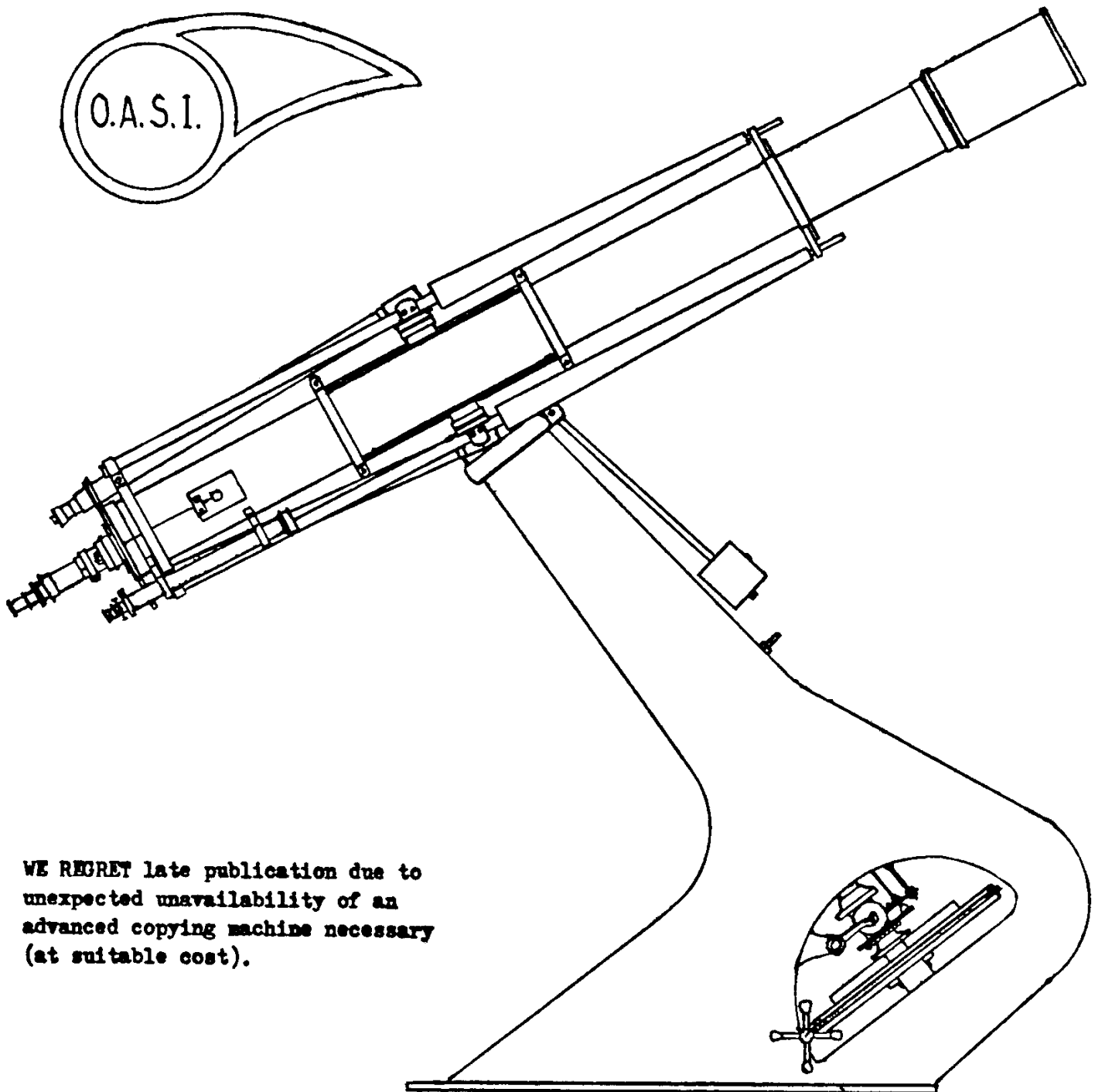
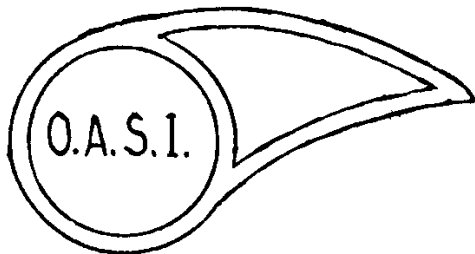


Editor: Mr. Paul Burt, , Ipswich IP1 6PP 'Phone Ipswich 

Producer: Roy Adams, , Ipswich IP2 9ST 'Phone Ipswich 

Your submissions of items for the Journal will be welcome.



WE REGRET late publication due to unexpected unavailability of an advanced copying machine necessary (at suitable cost).

THE NIGHT SKY AS SEEN FROM ORWELL PARK THIS MONTH

Cygnus and Lyra dominate the zenith area, with Deneb and Vega forming the Summer Triangle together with Altair (alpha Aquilae). The Milky Way runs right through the area, and presents a glorious view through binoculars. Albireo (beta Cygni) is an easy and striking double, with 35" arc separation and colours of yellow and blue-green. To the north and north-east of Aquila lie Sagitta and Delphinus respectively, two small but easily identifiable constellations. Gamma Delphini is a good double with 10" arc separation and colours of yellow and blue-green.

THE SUN

Sunrise at the beginning of the month is at 03h40m, changing to 04h20m at month-end. Sunset changes from 20h30m to 20h00m. The Sun moves from Gemini to Cancer during the course of the month.

THE MOON - Phases (July)

New Moon	5d09h50m	Full Moon	20d03h05m
First Quarter	13d10h49m	Last Quarter	26d22h31m

Occultations

Star	Phase	Mag.	Time	
*692	D	1.1	2d15h26.4m	D = Disappearance
*692	R	1.1	2d16h07.3m	R = Reappearance
3188	R	5.4	21d23h12.1m	* denotes star is double star
219	R	5.1	26d02h49.8m	listed according to Zodiacal
				Catalog (ZC) number.

THE PLANETS

Mercury is an evening star reaching maximum elongation from the Sun of 27° on the 22nd at magnitude 0.6, but setting only an hour after the Sun.

Venus is an evening star setting about two hours after the Sun, and increasing in magnitude from -3.5 to -3.7 through the month. It is 0.1° N of Saturn on the 10th.

Mars moves from Leo toward Virgo during the month at magnitude 1.7, setting before midnight.

Minor planet Ceres reaches maximum magnitude 7.7 during the early part of the month, but is extremely low in the southern sky, RA 19h14m, Dec. -29°47' on the 11th.

Jupiter is in conjunction on the 10th, and therefore not visible this month.

Saturn is in Leo at magnitude 0.9, setting in the evening twilight by the end of the month. (See Venus.)

Source: BAA Handbook 1978. Please note all times are UT (= EST - 1h).

COMET NEIKER 1978f

Magnitude increases from 9.0 to 8.5 during the month (not as bright as originally predicted) as the comet moves toward the Sun. Predicted positions for the month are:

July 1	08h 53.99m	+37°00.2'
11	09h 11.41m	+33°55.3'
21	09h 29.24m	+30°37.6'

Paul Burt

O.A.S.I. NEWS

Mark Howe, who has presented our Night Sky data and other astronomical follow-on information for some time, is now in the throes of a move to London and ephemeride duties and other editorials has now been taken on by Paul Burt. Mark informs us that he hopes to write items for us from time to time as an ordinary member. Thanks,

Mark, for your past . . . It's nice to know we haven't lost you altogether!

We also have a new Secretary, Mr. Mike Barriskill, who generously agreed to be co-opted to this position, relieving a long-patient Mike Stov to whom further thanks are due. Our new secretary works nights, so normally has rather limited 'contact' time: the best time is about from 6 pm to 7 pm before he goes to work. His address is (C/o) Jack's Cafe, 4, Hadleigh Road, Ipswich, and for very important telephone messages (and perhaps some less important ones?) the number is Ipswich [REDACTED].

AUGUST DRAW - SATURDAY, AUGUST 26th, AT THE SUFFOLK CARAVAN CLUB MEETING at the OBSERVATORY

As most of you may know, we are not holding an Open Day as such this year, and the annual Draw will coincide as above. Prizes have not yet been purchased, but First Prize is expected to be a new Polaroid colour camera or something similar.

THE VOYAGER PROJECT Part 5 - The Spacecraft Itself

The Voyager Project is managed by the NASA Jet Propulsion Laboratory, the Lab. being responsible for building the two spacecraft and conducting Tracking, Communications and Mission operations. The launch vehicles are the responsibility of NASA's Lewis Research Centre. There are 11 science teams consisting of 85 scientists concentrating on different aspects of the mission.

Voyager is the most far-reaching spaceshot ever launched by NASA and as far as I know, any other country. It covers a distance of 2.87 billion km, about 19 times the distance of the Earth from the Sun.

The two spacecraft, since they have to travel so far away from the Sun, differ from the Mariners in that they have no solar panels to turn sunlight into electrical energy, since at that distance, the amount of sunlight is negligible. Instead of solar panels, the Voyagers use Radioisotope Thermoelectric Generators, as they are known in the jargon (abbreviated RTGs), which obtain their energy through the radioactive decay of plutonium.

The generators are placed on a beam extended from the spacecraft, thus preventing any stray radiation from interfering with the experiments. They develop a total of about 400 watts of power, of which 100 watts must be used to communicate with Earth (at the distance of Saturn). The science experiments consume 108 watts (bear in mind the wattage of your average everyday light-bulb, and think of all the scientific experiments that must be operated using this power).

The antennae also differ from the Mariner spacecraft. To return information with a given amount of transmitter power at that distance, a much larger antenna is needed than those designed for exploration of the inner planets. The antennae are dish-shaped and 3.7 m in diameter. They are, of course, precision built to stop as much wasteful scattering of radio waves as possible.

Together with the improved transmitter and the large receiving aeriels of the Deep Space Network around the Earth, Voyager is able to send us back 115 000 bits of information per second from Jupiter and 44 000 from Saturn. (To get an idea of the 'size' of a bit, you can only send information over your telephone at a rate of 100 bits per second, however fast you try to talk.) The large, high-gain antenna is kept pointing constantly toward the Earth by what can crudely be described as electronic 'eyes'. There is a low-gain antenna in front of the large one so that just in case contact with Earth is lost due to some disorientation, a little contact can still be maintained and the computer can then restabilize the spacecraft.

S.G. Harvey

SPACELAB II, 1981-82

From eight candidates, it is expected that Bruce Patchett of Appleton Laboratory, and Keith Strong of Mullard will be the choice British personnel for the 7-day in-space mission. Two other British candidates are for back-up. Final selection this summer.

EXCITING NEW FACTS ABOUT ORWELL PARK OBSERVATORY

by Charles Radley, B.Sc., A.R.C.S., A.M.Inst.P.

Recently, Mike Barrikill and I, assisted by Peter Weston, F.R.A.S. from Colchester, have unearthed some new information about the early days of Orwell Park Observatory. Apparently, between 1872 and 1890 it was one of the major observatories in the world. It was used continuously for 18 years, and a vast body of observation was accumulated by the astronomer who used it. These observations were published in the Monthly Notices of the Royal Astronomical Society, starting in Volume 33, ending in Volume 51. More of that in a minute. Read on...

It all happened on Wednesday, May 31st 1978. Mike Barrikill and myself both had a week off work, and on that day we went to the BAA Exhibition Meeting in London. In the afternoon we called in at the Royal Astronomical Society (RAS) premises at Burlington House. On the stairs there, we bumped into Peter Weston, F.R.A.S. of the Colchester Amateur Astronomers.

'Hey!' he said, 'I've found out who your astronomer was!'

In the RAS Library, he showed us an ancient book entitled (translated from the French), "General List of Observatories and Astronomers", a Third Edition published in 1890. Guess what?! Orwell Park was listed in it! It was written in French (by one A. Lancaster) since the book was published by the Royal Observatory of Brussels in Belgium.

Here is what it said about Orwell Park, first in the original French, with below that, my translation:-

'IPSWICH (Angleterre).

Observatoire du Colonel Tomline, à Orwell Park.

Assistant: J.I. Plummer.

Lat. 52° 00' 33" N

Long. Oh 4m 55.8s E

Le Colonel Tomline étant mort l'année dernière, son observatoire aura bientôt cessé d'exister.

Ses héritiers n'ont pas l'intentions de la maintenir.'

'IPSWICH (England).

Observatory of Colonel Tomline, at Orwell Park.

Assistant: J.I. Plummer.

Lat. 52° 00' 33" N

Long. 01° 13' 57" E

Colonel Tomline died last year; his observatory will soon cease to exist.

His heirs have no intention of maintaining it.'

The above entry contained one item which was new to us, the name of the 'Assistant', J.I. Plummer. We looked up his name in the RAS Library Authors catalogue, and sure enough, he had written two books and several articles in the RAS Monthly Notices. We then looked them up. This is what we deduced:

John Isaac Plummer, M.A., F.R.A.S. in the early 1870s was "The Astronomical Observer to the University of Durham" until 1873. In 1872 he wrote a book entitled, "Introduction to Astronomy for the Use of Science Classes and Elementary and Middle Class Schools." It was a very good book in fact; highly accurate and packed with information, without the idle speculation which many books are padded-out with. I can recommend you read it. Unfortunately it is out of print! However, you can see it at the Royal Astronomical Society Library, Burlington House, Piccadilly, London W1V 0NL, where the Librarian is Mrs. Lake. I recommend you do so.

At that time (1874) John Plummer was still at Durham, where his projects included measuring the size of Venus, observing lunar occultations (the latter made him interested in the lunar atmosphere). In 1874 he moved to Ipswich and became Tomline's Assistant at the newly-completed Orwell Park Observatory. He went straight to work.

He tried to obtain a quantitative measure of the brightness of Venus by comparing it with a standard whale-oil candle, since there were no electronic photometers in those days. He observed various comets. On 11th February 1876 he was elected a Fellow of the Royal Astronomical Society.

On 6th May, 1878 ('exactly' 100 years ago now) he observed (through cloud) the transit of Mercury across the Sun. His wife, who was with him, saw it first (before Plummer himself) against the solar corona. Plummer wanted to observe the Zodiacal Light with a spectrograph; we do not know whether Orwell Park ever had one, however.

One quaint article he published about Orwell Park was entitled, "On the Supposed Influence of a Mass of Brickwork Upon the Errors of a Transit Instrument in Its Neighbourhood."

Plummer's employer, Tomline, died in 1889. But Plummer continued to use the observatory right up to the end of 1890. Alas, his attempts to persuade the new owners of Orwell Park to keep up the observatory failed. We all know what has happened since.

Plummer's last mention in the Monthly Notices of the RAS was dated 10th November 1890 when he published a vast quantity of observations of comets he had recently made with the ten-inch.

After that, John Isaac Plummer faded into obscurity. In 1894, his name was removed from the RAS Fellows list, probably for not paying his subscription. The very last record of Plummer was in 1910 when he published a book in Hong Kong entitled, "The Origin of Typhoons." Then the trail went completely cold.

When and where he died (or was born, for that matter) I just do not know. I intend to pursue my research to find out more about this man, and the early days of Orwell Park.

If you ever go down to London for a day, I recommend you visit the RAS Library. Plummer's writings are too numerous to mention here in a list, but I promise you could spend an entire day there, reading about what he did. Perhaps you will find something I missed. I hope you do.

Finally, I must make some acknowledgements. Many thanks to Peter Weston, F.R.A.S. Without him I would never have found out all the above, he gave me that vital break I'd been hoping for for years.

Secondly, thanks to Peter Gill at the RAS Library, who helped me hunt through those old books, and literally and metaphorically unlocked several dusty doors.

And thanks to Mike B. for driving and helping generally.

END

GEOS-2 LAUNCH by Charles Radley

On Friday, July 14th is the scheduled launch of GEOS-2. GEOS-1 was launched about a year ago. GEOS-1 and -2 were built by British Aerospace Dynamics on behalf of the European Space Agency, to be launched by an American rocket. GEOS is a magnetic field and plasma space science satellite.

GEOS-1 was planned to go into a circular, 24-hour orbit. Unfortunately the launch went wrong and GEOS-1 ended up in an elliptical 12-hour orbit which has severely restricted its usefulness. GEOS-2 is the back-up, and will be the second attempt to get a GEOS into correct orbit. Let's hope the launch is successful this time.

It has long been speculated - for almost as long as black holes have been considered, in fact - that there is a link between black holes and quasars. Black holes, of course, are objects so massive that light cannot escape them. They can only be detected by their association with X-rays, and it has been suggested that surface effects associated with black holes are responsible for the prodigious energy output of quasars and some radiogalaxies. These extragalactic objects with redshifts of up to $z = 3.53$ have been an enigma since their discovery in 1963.

Recently two pieces of evidence supporting the hypothesis of a link between quasars and black holes have come to light. The first came from observations of an extremely small jet emanating from the nucleus of the galaxy NGC6251, suggesting that radiogalaxies - and by inference, quasars - depend on black holes as power sources (for details, see O.A.S.I. Journal, April 1978).

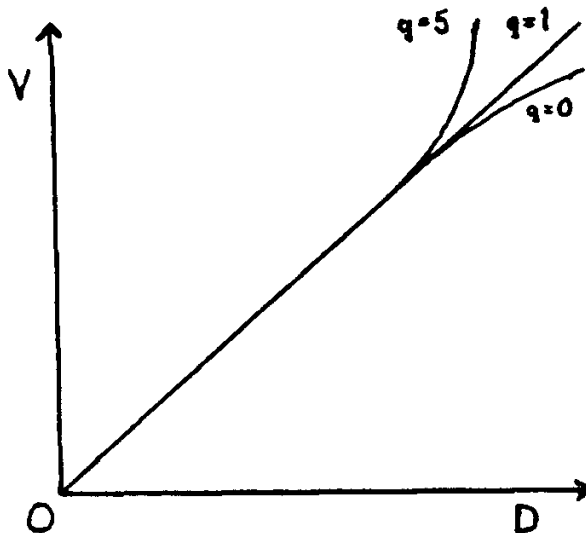
The second piece of evidence is more recent; the closest quasar to the Earth is an emitter of X-rays and its characteristics are so similar to those of a particular kind of active galaxy that a link between galaxies and quasars seems very likely. But the most exciting recent development in the theory of quasars comes from a new observational technique pioneered by a British astronomer from the Institute of Astronomy in Cambridge.

In 1928, Edwin Hubble at Mount Wilson discovered a relationship known as Hubble's Law, which tells us that all objects (at appreciable distances apart) in the Universe are receding from one another and that the velocity of recession, v , is proportional to the distance between the two objects, D , that is,

$$v = HD$$

where H is a constant known as Hubble's constant.

Now it has since been discovered that this is not always strictly true (quite apart from the case of the Local Group of galaxies, which have a common velocity and which therefore do not recede from each other) and that for large distances a linear law is not obeyed. In particular, a graphical plot of v against D should reveal one of three broad cases as described below (with reference to the diagram).



- $q = 1$: In this case, Hubble's Law holds strictly, and velocity of recession is directly proportional to distance;
- $q = 5$: Here the more distant objects are receding more rapidly than expected, implying that the rate of expansion of the Universe was greater in the past than at present (since we are viewing the more distant objects as they were millions of years ago);
- $q = 0$: This case implies that the rate of expansion is in fact becoming less as time goes on.

Unfortunately, up until now the measurement of D has not been accurate enough for astronomers to decide which case holds good. This has all been changed by the new technique. Professor J.A. Baldwin, together with three American astronomers, has made observations of the Carbon III line in the spectra of quasars. Knowing that

the intensity of this particular spectral line depends in a known way upon the absolute luminosity of a star, Baldwin has calculated the absolute magnitudes of a number of quasars. Comparison of these values with the values of the apparent magnitudes gives an accurate estimate of the distance of these quasars.

Baldwin has so far observed 31 quasars: a plot of v against D for these objects shows that the second case ($q = 5$) is the correct one. Although it will not be absolutely certain whether this is the right conclusion until more observations are made, it seems that at long last, the question of whether the Universe will expand forever or will eventually begin to contract (and then possibly oscillate) has been answered.

FROM OTHER JOURNALS - Mars: The Stripes on Phobos

It was discovered last year, through photographs taken by the Viking Orbiter, that the surface of Mars' major satellite, Phobos, is deformed by grooves running across most of the surface. Now two American researchers have come up with convincing evidence that the grooves are caused by the same catastrophic event that was responsible for the formation of the giant crater Stickney.

Firstly, more recent Viking photographs reveal that the grooves radiate from the Stickney crater and run right the way round Phobos before fading out at the opposite side of Stickney. Secondly, a count of the number of craters found in the grooves in comparison to the number outside, shows that the craters are approximately 1000 million years old, about the same age as Stickney.

The other main theory about the grooves - that they were formed by tidal stresses - demands that they be much more recent. So it appears that the stripes on Phobos were caused by the impact of a huge meteorite about 1000 million years ago. (Nature-Times News Service).

GOOD TELEVISION THIS MONTH By Charles Radley

The BBC are broadcasting three TV programmes in a new series entitled "Spaceships of the Mind." They cover such subjects as colonizing and exploiting the Moon and asteroids; Project Daedalus - unmanned space probe to Barnard's Star, and the general Space programme around 2000 AD.

It is not to be missed. The first programme was on 21st June (from 7.35 pm until 8.25 pm). Programme 2 is on Wednesday 28th June, and Programme 3 on Wednesday 5th July.

Don't miss them! (As if you would.)

BARNEY'S FIREBALL

Partly owing to the imminency of OASI Journal photocopying date, for the last Journal, partly to too small a chink in space (in the Journal proof!) and a non-instant postal service (!....) mention of this didn't get in. The object was seen at Levington Ship on May 27th, at 21h22m UT. It started 2° W of Mars and finished 1° E of Pollux. Magnitude was -5, colour white, and there was no train. The sky was very clear with some twilight. Anyone else who may have seen this, please contact Dave Barnard.

ORWELL PARK SCHOOL PARENTS' DAY, JUNE 24TH

Representatives of the OASI would like to express thanks to all parents and others displaying interest in the Observatory and Society activities, and for donations received. In spite of sporadic cloud, a good demonstration of solar projection lasting on and off for at least a couple of hours was given, and the new 'clock' drive - Alan's squirrel-cage motor and oscillator etc, performed extremely well. (Roy Adams)

PROGRAMME FOR JULY 1978 At ORWELL PARK OBSERVATORY, NACTON, I^CCH

TUESDAYS from 7 pm: Planetary Section July 11th and 25th

Directors Mr. J. Deans, [REDACTED], Capel St. Mary 'Phone Gt. Wenham [REDACTED]
and Mr. J. Hood, [REDACTED], Ipswich

TUESDAYS from 7 pm: Solar, Lunar and Planetary Section July 4th and 18th

Directors Mr. J. Hood, [REDACTED], Ipswich
and Mr. M. Barritt, [REDACTED], Ipswich

THURSDAYS from 8 pm: Double Stars Section July 6th and 20th

Director Mr. D. Bearcroft, [REDACTED], Ipswich 'Phone Ipswich [REDACTED]

FRIDAYS from 8 pm: Variable Stars Section July 7th and 21st (Please see below)

Directors Mr. R.S. Manning, [REDACTED], Ipswich 'Phone Ipswich [REDACTED]
and Mr. M. Siggers, [REDACTED], Ipswich

Other meetings at the Observatory may be arranged by previous agreement.

Meetings are usually held each Saturday on FOXHALL HEATH, IPSWICH for shower or sporadic meteor counts. Please contact Meteor Section Director Mr. D. Barnard, [REDACTED], Ipswich 'Phone Ipswich [REDACTED]

Other meetings are occasionally held, and for further information about the Orwell Astronomical Society and activities, please contact any of the persons mentioned above or on the front cover, or

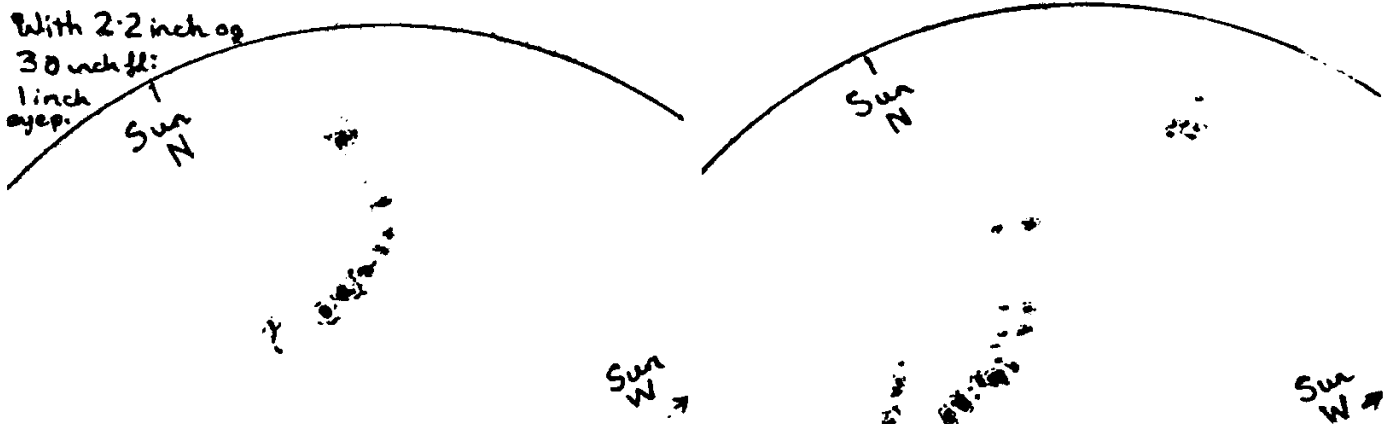
Assistant Chairman, Mr. Alan Smith, [REDACTED], Ipswich 'Phone Ipswich [REDACTED], or
Treasurer, Mrs. P. Long, [REDACTED], Ipswich 'Phone Ipswich [REDACTED],

COMMITTEE MEETS JULY 15TH (SATURDAY) at 8 pm at the Observatory.

VARIABLE STARS SECTION ANNOUNCEMENT As far as usual activities are concerned, the Variable Stars Section will be closed during the summer, reopening on September 1st.

METEOR NOTES have not arrived at all this month, and it is hoped this will not deter diehards from trying to catch something in this line even if it is too hot to hold? Even though twilight admittedly reduces the chances this month. Instead, as at least a couple of members suggested, having seen the drawings below, I am including a pair of cut-outs from my solar drawings, originally in ball-point (black) pen direct on white card as front projection screen. Absolute scale is not guaranteed and actual view is reversed left for right, cardinal points approximate only. The two-day separation shows solar rotation (pictorially reversed) and new groups developing. (Roy Adams)

With 2.2 inch og
30 inch fl:
1 inch
eye.



1978 May 25th 17^h50^m UT

1978 May 27th 18^h25^m UT

Answer to last Journal's Puzzle corner: Cambridge Observatory coelestat (pictured 1959)